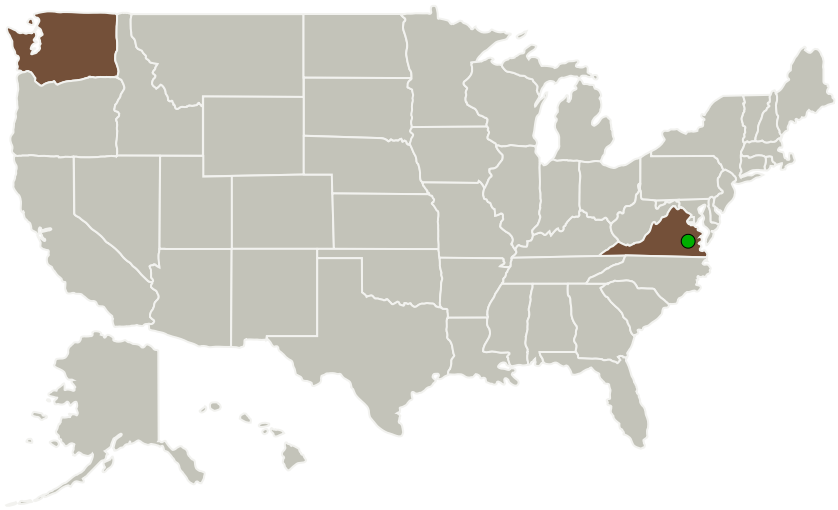
The Automated X-Link for Orbital Networking (AXON) Connector, Phase I

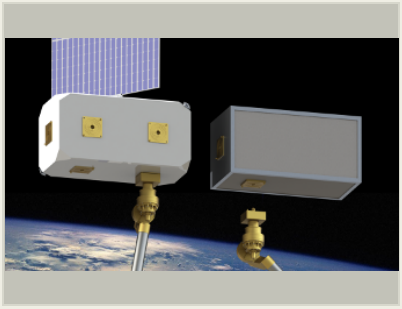
Completed Technology Project (2017 - 2017)

Project Introduction

NASA has identified the need for a joining technologies to support the ability to connect spacecraft components autonomously in-space. The joining technology should be modular, reversible, have an open-architecture, and allow "plug-and-play" functionality for maximum flexibility and utilize simple approaches amenable to robotic assembly and disassembly. TUI has been working on structural truss joining (Class 1 joints) and robotic connection approaches through separate efforts and has several ongoing and future efforts that will require in-space joining of modular systems (Class 2 joints). TUI proposes to develop and demonstrate an open-architecture Class 2 joining solution called the Automated X-Linked for Orbital Networking (AXON) connector. The AXON connector will be a reversible module-to-module connector that minimizes mass and complexity while maximizing assembled stiffness, strength, power transfer, and data communications. The development of the AXON connector will leverage TUI's existing programs and place emphasize automated robotic mating and de-mating. In the Phase I effort, we will identify a complete set of requirements, develop a concept design, fabricate the concept using TUI's 3D printing and rapid prototyping capabilities, and test the AXON connector using TUI's Baxter robot. In the Phase II effort, TUI will mature the Phase I design and perform reliability testing.

Primary U.S. Work Locations and Key Partners





The Automated X-Link for Orbital Networking (AXON) Connector, Phase I Briefing Chart Image

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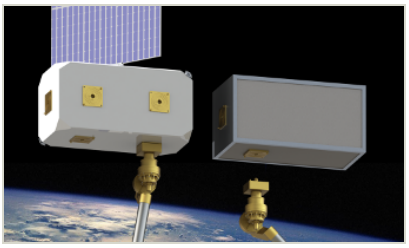
Organizations Performing Work	Role	Type	Location
Tethers Unlimited Inc	Lead Organization	Industry	
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Virginia	Washington

Images



Briefing Chart Image
The Automated X-Link for Orbital Networking (AXON) Connector, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/133042)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Tethers Unlimited Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

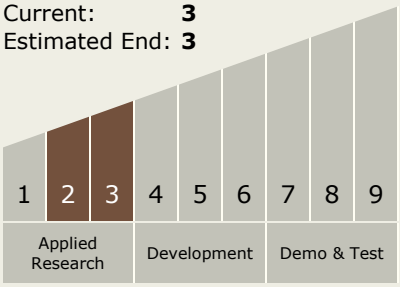
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Blaine A Levedahl

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.4 Micro-Gravity Construction and Assembly

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System